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Deposing Expert Witnesses in Environmental Litigation

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Note from the Field

DEPOSING EXPERT WITNESSES IN ENVIRONMENTAL LITIGATION

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I. BACKGROUND

A. Environmental Litigation Cannot Be Successfully Prosecuted or Defended Without Experts

ENVIRONMENTAL litigation[1] is, by nature, hyper-technical. To win, or to defend, such cases ordinarily requires the collaborative efforts of lawyers, scientists, and engineers serving in consulting and expert witness roles.[2] Depending on the case, the trier of fact will need to be acquainted with the alleged polluter's manufacturing and waste handling processes, the raw materials, intermediates,[3] products, byproducts, and wastes used or generated in those processes, the topographical and hydrogeological setting of the property in question,[4] the nature and extent of the contamination, pathways[5] by which humans could have been exposed, and the personal injuries or diseases allegedly suffered. The trier of fact will also need assistance in determining liability and damages issues.

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1. For the sake of this Note, the author regards the term "environmental litigation" broadly, to include both bodily injury (i.e., toxic tort) and property damage (i.e., remedial investigation and cleanup) cases, including insurance coverage disputes where environmental contamination underlies the coverage case.

2. For a further discussion of the roles of consultants and experts in environmental litigation, see section III.A. of this Note.

3. An "intermediate" may generally be defined as any chemical or material generated during the course of manufacture which is not a product in and of itself, but becomes a constituent of a final product. *See* American Mining Congress v. EPA, 824 F.2d 1177, 1179 (D.C. Cir. 1987).

4. Topography (the configuration or relief of the earth's surface) and hydrogeology (the science of underground water) are critical factors in hazardous waste cleanup cases. Together they influence the means by which pollutants enter and flow through the environment. *See* Bradley Mining Co. v. EPA, 972 F.2d 1356, 1357 (D.C. Cir. 1992); Dedham Water Co. v. Cumberland Farms Dairy, Inc., 972 F.2d 453, 455-56 (1st Cir. 1992).

5. The pathways for human exposure include air, surface water, and ground water. Eagle-Picher Indus., Inc. v. EPA, 822 F.2d 132, 137 (D.C. Cir. 1987).

Both the plaintiff's and the defendant's experts will usually be deposed during the course of litigation to discover their opinions. Such depositions are of critical importance to both sides. The proffering party will want to limit the amount of information disclosed to the other side because such information can reveal trial strategy and the expert's weaknesses. The interrogator, on the other hand, will usually want to probe deeply into the expert's qualifications and experience in order to undermine the expert in various ways. Since the deposition is a "sneak preview" of what will happen at trial, the expert deposition is a most critical event in the course of environmental litigation. Information revealed, or not uncovered, in a deposition can greatly influence the outcome of a trial.

B. Types of Experts

As noted above, experts may be retained to give testimony about a myriad of issues. Experts, like lawyers, tend to be highly specialized. Examples of the types of expertise that may be required are as follows:

1. Experts who can explain the physical/chemical nature of the pollutant.[6]
2. Experts who can explain the manner in which the pollutant initiates, promotes, or causes the disease to progress in humans.[7]
3. Clinical doctors.[8]
4. Environmental/Chemical/Mechanical/Process engineers.[9]
5. Experts in fate and transport of chemicals in air and subsurface environments (soil, groundwater, surface water, air).[10]
6. Toxicologists.[11]

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6. Chemists or chemical engineers, for example, frequently have this type of expertise.

7. Medical doctors, biochemists, cellular biologists, and toxicologists are examples of professionals with this of type expertise.

8. These physicians can confirm or refute the diagnosis.

9. These types of engineers can explain the production and release (or non-production and containment) and storage, handling, treating, and disposal of wastes/pollutants.

10. A hydrogeologist is one example of a scientist with expertise in the transport of groundwater.

11. Toxicologists can explain the movement of toxic agents in the natural or work environment and explain their interaction with, and effect upon, human or biotic systems.

7. Risk assessors/National Contingency Plan (NCP) compliance experts.[12]
8. Biologists.[13]
9. Industrial hygienists.[14]
10. Epidemiologists.[15]

The distinctions between some of the above specialty areas are not always clear and some experts profess to have expertise spanning several disciplines. As a practical matter, however, it is impossible to be truly expert in more than one substantive area. Thus, it is important during the deposition to pin the expert down to a particular field of expertise or, alternatively, to allow the expert to try to portray himself as an expert in more fields than the trier of fact will consider plausible.

II. EXPERT DISCOVERY GENERALLY

The broad purpose of expert discovery is to first determine the facts known and opinions held by your opponent's witnesses and the bases for those opinions. Secondly, the litigator will also want to assess how well the witness will function at trial. Some experts are cool, composed, and savvy when dealing with members of their own camp, but fall apart when challenged in the course of a deposition. A third purpose is to obtain admissions from the expert which will undermine the expert's credibility at trial, or support the expert testimony the attorney will use at trial. Finally, the deposition will help both sides evaluate the expert's credibility and manner of presentation.[16] Some experts are simply incapable of delivering testimony at this level, a fact which should become apparent in the deposition.

Some attorneys use depositions to destroy the opponent's expert by discrediting and impeaching his qualifications or testimony. This practice is dangerous because it may give your oppo-

12. Risk assessors and NCP compliance experts are typically persons with environmental engineering or hydrogeology skills. For a further discussion of the NCP, see *infra* notes 97-104 and accompanying text.

13. Biologists can offer testimony on the adverse effects of hazardous substances on living organisms.

14. Industrial hygienists can testify about industrial hygiene conditions or practices in an occupational exposure case.

15. Epidemiologists are scientists who study the distribution and causation of diseases in groups of people, typically after years of study of those groups.

16. For example, in a jury case, it is imperative that one's expert be capable of communicating sophisticated technical ideas to a lay audience, the jury, without appearing condescending or confusing.

nent time to procure another, stronger expert. Thus, it is sometimes worthwhile to reserve particularly damaging cross-examination for trial. On the other hand, it may sometimes be a good strategy to deify, rather than skewer, the expert. In cases where the expert has done a responsible job of discovering contamination and recommending cleanup options to the client, but the client has ignored the advice, making the expert look good drives a wedge between the expert and client and may help prove a case of negligent conduct, or even help form the basis for an award of punitive damages.

III. GENERAL AND PRE-DEPOSITION CONSIDERATIONS

A. Your Relationship to the Expert; Consultants vs. Experts

The distinction between consultant and expert, although seemingly inconsequential, actually may have far-reaching consequences in a case, and may become a problem in any expert deposition. If an engineer or scientist is hired by a client or law firm to give general environmental advice or assist in a nonadversarial situation, and if discovery of the communications between the consultant and the client or law firm, or the consultant's notes, reports, or other work is reasonably calculated to lead to the discovery of admissible evidence, this information may have to be disclosed to opposing parties during any subsequent litigation.[17]

In contrast, if the consultant is retained or specially employed in anticipation of litigation or preparation for trial but is not expected to testify at trial, an opponent will generally *not* be entitled to obtain the consultant's notes, reports, or work product, or learn about the consultant's opinions concerning the matters at issue.[18] If, however, the consultant performs environmental, medical, or other technical work and expects to rely upon that work at trial as an expert trial witness, opposing parties will, in most jurisdictions, be entitled to take the expert's deposition before trial to learn about the work performed by the expert, and the expert's substance of the opinions and the bases therefore unless the opponent can demonstrate "exceptional circumstances under which it is impracticable for the party seeking discovery to obtain facts or opinions on the same subject by other

17. *See* FED. R. CIV. P. 26(b)(1) (permitting "discovery regarding any matter, not privileged which is relevant to the subject matter involved in the pending action . . . .").

18. FED. R. CIV. P. 26(b)(4)(B).

means."[19]

In most cases, attorneys defending an expert deposition can legitimately claim that certain communications with, or work done by, the expert is not discoverable because it was done in the expert's role as a consultant, not as an expert trial witness.[20] However, even if the information was generated in the course of a consultancy, if the expert will rely upon it in support of his opinions at trial, it will likely be discoverable.[21]

In sum, experts who are hired in anticipation of litigation or as trial preparation consultants, and who are *not* expected to testify at trial are generally shielded from discovery.[22] On the other hand, expert trial witnesses and other experts who perform services in the ordinary course of a client's business will likely have to disclose information about their work and opinions at a discovery deposition.[23]

B. The Attorney-Client Privilege and Work-Product Rule

The attorney-client privilege is, simply stated, a policy designed to protect a client's right to keep his discussions with his attorneys confidential.[24] Basically, any and all discussions which

19. *See* FED. R. CIV. P. 26(b)(4)(A)(i). Although this rule limits discovery of these matters to expert interrogatories, and permits further discovery by other means (e.g., by depositions) only pursuant to a court order, as a practicable matter many litigants simply agree to depose each others' experts.

20. *See* FED. R. CIV. P. 26(b)(3) & (b)(4)(B).

21. *See* FED. R. CIV. P. 26(b)(3) & (b)(4)(A)(i).

22. FED. R. CIV. P. 26(b)(3) & (b)(4)(B).

23. FED. R. CIV. P. 26(b)(1) & (b)(4)(A)(i).

24. Privileges are generally a creature of federal and state common law. In the federal courts, this is provided for by rule. *See* FED. R. EVID. 501. Article V of the Federal Rules of Evidence, as submitted to Congress, included thirteen specific non-constitutional privileges, including the lawyer-client privilege. FED. R. EVID. 501 Report of House Committee on the Judiciary. The House Committee on the Judiciary eliminated all of the specific rules on privilege, and substituted one general rule on privilege — Rule 501. *Id.* Rule 501 states in pertinent part:

> Except as otherwise required by the Constitution of the United States or provided by Act of Congress or in rules prescribed by the Supreme Court pursuant to statutory authority, the privilege of a witness, person, government, State, or political subdivision thereof shall be governed by the principles of the common law as they may be interpreted by the courts of the United States in the light of reason and experience. However, in civil actions and proceedings, with respect to an element of a claim or defense as to which State law supplies the rule of decision, the privilege of a witness, person, government, State, or political subdivision thereof shall be determined in accordance with state law.

FED. R. EVID. 501. *See* Upjohn Co. v. United States, 449 U.S. 383 (1981) (discussing attorney-client privilege in corporate context).

solely involve the attorney and client cannot be invaded by the "other side" unless the client waives his right to the privilege.[25] The work-product rule, on the other hand, is a doctrine which protects from disclosure any information or documents which reflect the attorney's thought processes, legal theories, or strategies developed during the course of representing a client.[26]

An attorney must keep these concepts in mind when the relationship with an expert is first established, as well as the role each party can play in safeguarding (or unwittingly undermining) these privileges. If an expert/consultant reports directly to the client with no attorney involvement, the risk of ultimately having to disclose these communications is enhanced, unless the client is an attorney acting as such; for example, a corporate officer or employee who is trained, or licensed, as an attorney but is not acting as an attorney cannot claim the privilege.[27] Dealing with the client's attorney, who in turn deals with the client, may be a way of protecting sensitive information, since the expert's/consultant's consultations with the attorney may fall within his work-product shield, and the attorney's discussions with the client may be protected by the attorney-client privilege.[28] Thus, even if no litigation is threatened or pending at the time the expert is retained to do the work, it should always be assumed that, perhaps years down the road, everything that is said and done in the course of representing the client may ultimately fall into an opposing party's hands as evidence against the client.[29]

C. Specific "Relationship" Issues Which May Arise at Deposition

Experts will invariably be asked at their deposition to produce a copy of their complete file in the matter, including letters to and from the client (or attorney) and a copy of the proposal or

25. Kevin A. Gaynor et al., *Criminal Enforcement of Environmental Laws*, *in* ENVIRONMENTAL LITIGATION 215, 237-38 (Janet S. Kole & Larry D. Espel eds., 1991).

26. FED. R. CIV. P. 26(b).

27. *See* United States v. Woodruff, 383 F. Supp. 696 (E.D. Pa. 1974) (to assert attorney-client privilege, person to whom communication was made must be acting as attorney in connection with communication).

28. Attorney-client privilege gives greater protection to confidential communications than the work-product rule. Gaynor, *supra* note 25, at 238 ("In contrast to the attorney-client privilege, the work-product doctrine is not absolute.").

29. For a discussion of techniques that help to ensure that information gathered in an internal corporate investigation will be protected by the attorney-client privilege and work-product doctrine, see *id.*

contract under which the work has been performed. Obviously, this can prove embarrassing, particularly if, for example, the engagement letter suggests the conclusions the client or attorney expects the expert will reach. Also, if the expert is being paid a higher than usual fee, or a fee which is grossly out of proportion to what is customary in the area, it will suggest bias to the trier of fact, and therefore may harm one's case. Another example is the expert's personal notes, which might contain statements made by the expert revealing his uncertainties or fears, or conceding the wisdom of certain aspects of the opposing party's expert theories.

Experts will also usually be asked about all meetings they attended, who was present, what was discussed (including what the lawyer said), what documents were shown to him, and so forth. Experts also may be asked about previous engagements by the same or other clients, the number of times the expert has worked for plaintiffs as opposed to defendants, and other questions geared toward categorizing the expert's historical orientation in litigation matters.[30] Such questions are often permissible and may have to be answered. Thus, as previously suggested, it should always be assumed that every written and verbal exchange between lawyer, client, and expert will be discoverable, and that information about the expert's prior engagements and testimony will also have to be disclosed.

IV. THE DEPOSITION ITSELF

A. Ministerial and Preparatory Matters

The retention of an experienced court reporter who will not interrupt the proceedings is essential. Although they are somewhat rare, a reporter with a scientific or medical background or experience can make an expert deposition run much more smoothly. Even with an experienced court reporter, though, it is often a good idea to have the expert read and sign the transcript to ensure its accuracy.

It may be a good idea to have the expert prepare and bring to the deposition a list of the principal texts and publications upon which he relies in support of his opinion(s). While in some cases this might give the opponent an unfair advantage, a good interrogator will try to extract this information from the witness anyway,

30. An expert's possible financial connection to industry should be explored. Ron Simon, *How to Win the Battle of the Experts*, TRIAL, Oct. 1992, at 36, 38. In addition, speeches given by an expert at conferences can also reveal any bias. *Id.*

and having it pre-prepared may both assist the expert and cut down the length of the deposition.

Similarly, exhibits the expert will rely upon at trial should be available at the deposition. Failure to make them available at the deposition may give the opponent grounds to preclude their use at trial on grounds of prejudice.

Obviously, the witness will need to be "prepped" for the deposition. However, some attorneys overlook or downplay this task in the belief that the expert is a sophisticated, articulate professional who can handle any question that is directed to his attention. Such an attitude is dangerous, as experts often need as much, if not more, preparation as do ordinary fact witnesses. This is because they are so knowledgeable about their area of expertise that they often feel obligated to disclose everything they know at the deposition, believing the judicial process requires it. Similarly, experts who are employed in academic settings are used to lecturing and explaining and find it difficult to adjust to a litigation environment, in which the basic idea, at least during the deposition, is to limit the amount of substantive information that is revealed.

Additionally, it is always critical going into an expert's deposition to know as much about the expert as possible. The expert's prior deposition and trial testimony from other cases should be reviewed, as should his or her published writings. Answers to expert interrogatories and expert reports should be scrutinized and, where the issues are extremely technical, one's own expert should be consulted for advice on how to interrogate the opposing expert. Also, the expert's file(s), including notes taken in the course of preparing the expert's opinion, can often be fertile ground for developing good deposition questions.

Finally, when interrogating the expert at the deposition, look for biases and inconsistencies. For example, such things as an unusually high expert fee and the witness's record of testifying for only plaintiffs or defendants should be made part of the record. Also, it is often wise to get the expert committed to particular general propositions or procedures which the expert generally accepts or follows and to then establish that, in this particular case, the expert deviated from his normal practice.

B. The Expert's Opinions

The expert's ultimate opinion is, of course, the central inquiry. The interrogator will want to pin the expert down to a pre-

cise statement of the opinion, and make sure that all of the opinions held by the expert are explored. The interrogator will also want to explore the basis for each opinion, including the texts and publications relied upon, the training and education the expert brings to bear upon the opinion, research results, and facts known or personally observed by the expert, as well as any facts withheld from him by his client.

The interrogator may want to test the opinion by seeing how well it stands up under different factual circumstances, and whether it is consistent with the opinions held by other experts in the case and with the prior testimony of the expert in other cases. In addition, the interrogator will want to know where the expert's expertise ends, and whether, in giving the opinion at issue, the expert has gone beyond that expertise. In any event, the interrogator will try to "box in" the expert by getting him to concede the boundaries of his expertise. Occasionally, the interrogator may discover an expert with an inflated view of the breadth of his expertise, which will not play well with the judge or jury.

In some cases, it may be important to know whether the defendant's actions conformed to the "state of the art" at the time.[31] For example, in order to establish negligence, a plaintiff will want to show that the defendant's waste handling/disposal practices were substandard.[32] Similarly, in an environmental insurance coverage case, the insurance companies will want to show that the insured polluter "neither expected or intended" that damage or harm would result from its conduct.[33] For example, if the expert has an industrial background, the interrogator will certainly try to establish that the expert's former employers utilized commer-

31. "State of the art" refers to the level of understanding or development in a given field at any particular point in time. Of course, in some cases, the strict liability nature of many environmental statutes renders inquiries about the defendant's conduct or knowledge irrelevant. However, many suits nonetheless include claims based on such common law theories as negligence, nuisance, trespass, or strict liability.

32. *See* Sterling v. Velsicol Chem. Corp., 855 F.2d 1188 (6th Cir. 1988). In *Sterling*, the court concluded that the defendant, Velsicol, had not taken adequate precautions against the release of hazardous waste. *Id.* at 1192. The defendant disposed of "ultrahazardous" liquid and dry chemical waste by placing the waste in drums or fiber board cartons, respectively, and burying them in unlined trenches covered with three feet of soil. *Id.* at 1192 & n.1.

33. *See, e.g.*, City of Johnstown v. Bankers Standard Ins. Co., 877 F.2d 1146 (2d Cir. 1989) (discussing meaning of "neither expected or intended" language in insurance policies). For a general discussion of interpretations of the "neither expected or intended" clause in insurance policies, see John E. Heintz, *Insurance Coverage Litigation Issues, in* ENVIRONMENTAL LITIGATION 177, 199-209 (Janet S. Kole & Larry D. Espel eds., 1991).

cially available waste disposal equipment at the same time the expert's client was using the "old" technology.[34]

When waste handling, treatment, or disposal from decades ago is at issue, it is sometimes difficult to find an expert who is willing to admit that companies knew or should have known that what they did would result in pollution. Some plant managers and engineers who worked in industry in the 1940-1970 time frame (before most of the current environmental legislation was passed) will testify that their companies did "what everybody else was doing" at the time.[35] Of course, merely proving that a party's practices were consistent with industry practices may not be sufficient to demonstrate the absence of negligence, if the party could have adopted state of the art practices or equipment without excessive cost.[36] Even where the witness insists that industry officials lacked subjective knowledge that their activities were harmful to people or the environment, the interrogator will attempt to establish such knowledge indirectly.[37]

C. Standards for Admissibility

The Federal Rules of Evidence contain a general provision governing admissibility of expert testimony as follows: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise."[38] Various state rules exist, many of them identical or similar to the Federal Rule.[39] However, the rules of

34. Sterling v. Velsicol Chem. Corp., 647 F. Supp. 303, 316, 317 (W.D. Tenn. 1986) (finding of negligence was based partially on defendant's failure to comply with state of the art methods of hazardous waste disposal), *modified*, 855 F.2d 1188 (6th Cir. 1988).

35. *See id.* at 310.

36. *See id.* at 316-17.

37. This may be accomplished by showing, for example, that defendant's managers took steps to protect workers from the hazardous nature of the chemicals used in the workplace, or were repeatedly warned by neighbors or environmental regulators of the hazardous nature of their operations. *See id.* at 316.

38. FED. R. EVID. 702.

39. For example, Rule 56 of the New Jersey Rules of Evidence provides in pertinent part:

> RULE 56. TESTIMONY IN THE FORM OF OPINION
>
> (2) A witness qualified . . . as an expert by knowledge, skill, experience, training or education may testify in the form of opinion or otherwise as to matters requiring scientific, technical or other specialized knowledge if such testimony will assist the trier of fact to understand the evidence or determine a fact in issue.

evidence generally require exclusion of purported expert testimony that is (1) based upon speculation or "guesstimation," (2) not based upon factors or tests reasonably relied upon by experts in the field, or (3) would likely mislead the jury.[40]

For example, in *Sterling v. Velsicol Chemical Corp.*,[41] which involved plaintiffs' claims for immune system impairment, the court noted that an expert's opinions must be based upon generally accepted theories.[42] The court found that testimony of plaintiffs' expert immunologist and pediatrician was insufficient to sustain plaintiffs' burden of proof that the contaminated water damaged their immune systems.[43] The court reasoned that the clinical ecological[44] methodologies upon which plaintiffs' experts relied had been rejected by the leading professional societies in allergy and immunology as "unproven . . . [and] lacking any scientific basis in either fact or theory."[45] Moreover, the experts could not identify any studies of the effects of the chemicals of concern on the immune system.[46]

N.J. STAT. ANN. § 2A:84A, Rule 56 (West Supp. 1992).

40. Federal Rule of Evidence 703 provides:

> The facts or data . . . upon which an expert bases an opinion or inference may be those perceived by or made known to him at or before the hearing. *If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject*, the facts or data need not be admissible in evidence.

FED. R. EVID. 703 (emphasis added).

41. 855 F.2d 1188 (6th Cir. 1988).

42. *Id.* at 1208. The court found that "[i]n accordance with Rule 702, a four-part test must be met to uphold the admission of 'expert testimony': (1) a qualified expert (2) testifying on a proper subject (3) which is in conformity to a generally accepted explanatory theory (4) the probative value of which outweighs its prejudicial effect." *Id. But see* Rubanick v. Witco Chem. Corp., 593 A.2d 733, 748 (N.J. 1991) (in toxic tort litigation, theory not generally accepted by scientific community may be admissible if based on sound scientific methodology involving data and information comparable to that relied on by experts in given field). For a further discussion of *Rubanick*, see *infra* notes 52-64 and accompanying text.

43. *Sterling*, 855 F.2d at 1209.

44. As described by the court, "[c]linical ecology is premised on a belief that exposure to a number of factors including, but not limited to, anxiety, radiation, certain chemicals, and even some common household substances can cause dysregulation of the immune system." *Id.* at 1208.

45. *Id.*

46. *Id.* at 1208-09. One commentator has suggested several techniques that can increase the likelihood that expert medical testimony will be admitted. First, an attorney should validate the expert's methodology by referring to scientific texts or journals, or by asking another qualified expert to examine the methodology. Second, the expert should provide a detailed description of how cited articles support the expert's opinion. Third, the expert should describe how causation judgments are reached in clinical practice, as distinguished from judgments made by scientists performing research where patients are not involved.

D. The Expert's Qualifications and Theories

In re Paoli Railroad Yard PCB Litigation[47] illustrates a similar issue, namely, the expert's qualifications to render opinion testimony. In this case, the Third Circuit ruled that the trial court had abused its discretion by excluding certain testimony by plaintiffs' experts.[48] For example, the trial court refused to allow a toxicologist's testimony because she was not qualified to testify as a medical doctor as to the cause of injury or as a chemist about certain laboratory analytical procedures.[49] A microbiologist's testimony on the effects of polychlorinated biphenyls (PCBs) on humans was also excluded because the witness was not trained in differential diagnosis.[50] In overruling the trial court, the Third Circuit concluded that "[i]n light of the liberal Rule 702 expert qualification standard," the experts should not have been precluded from testifying "simply because the experts did not have the degree or training which the district court apparently thought would be most appropriate."[51]

In *Rubanick v. Witco Chem. Corp.*,[52] a New Jersey court examined the same issue, and reached a similar conclusion. In this case, a trial court's ruling preventing a biochemist from testifying about the link between PCB exposure and colon cancer was overturned on appeal.[53] The trial court noted that the witness had a doctorate in biochemistry, had worked as a biochemist for over thirty-seven years at the Sloan-Kettering Institute for Cancer Research, was published extensively on carcinogenesis, and was head of a research unit which investigated the diagnosis and treatment of colon cancer.[54] Nonetheless, the trial court found that although the witness was qualified to offer an opinion on cancer in humans generally, the court excluded his testimony because he was not a physician[55] and because the theory of causation he pro-

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Finally, to enhance overall credibility, the expert should carefully review any affidavit to be submitted for typographical errors, or any other errors, that hint at carelessness. Anthony Z. Roisman, *Toxic Tort Litigation: Lessons Learned*, TRIAL, Oct. 1992, at 22, 24.

47. 916 F.2d 829 (3d Cir. 1990), *cert. denied*, 111 S. Ct. 1584 (1991).

48. *Id.* at 856. Other circuits use a stricter standard for admissibility of expert testimony. *See* Roisman, *supra* note 46, at 24.

49. *Paoli R.R.*, 916 F.2d at 855.

50. *Id.*

51. *Id.* at 856.

52. 593 A.2d 733 (N.J. 1991).

53. *Id.* at 737.

54. *Id.* at 735.

55. The court believed that because the witness was not a physician he

posed was not generally accepted by the scientific community.[56] The appellate division reversed, and held that a more liberal standard is required for evaluating the reliability of evidence in toxic tort cases.[57] In such cases, the fact finder should focus on the underlying soundness of the novel scientific testimony.[58]

The New Jersey Supreme Court modified the appellate division's opinion, permitting an even broader standard of admission for expert testimony in toxic tort cases.[59] The court held that, "[a]lthough the proponent of an expert opinion must demonstrate that the data or information used were soundly and reliably generated and are of a type reasonably relied on by experts," the objective reliability of the opinion, or inferences drawn from data, do not have to be demonstrated.[60] The court specifically recognized that a novel scientific theory may be reliable, even if controversial, if it is based on sound methodology drawing on studies reasonably relied on by other members of the scientific community and has been used and applied by experts and practitioners in a given field.[61]

The New Jersey Supreme Court also stated that the Third Circuit's approach is compatible with that of New Jersey.[62] The court concluded that in toxic tort cases, a scientific theory of causation, even though not generally accepted, may be found reliable "if it is based on a sound, adequately-scientific methodology involving data and information of the type reasonably relied on by experts in the scientific field."[63] Thus, the New Jersey Supreme

therefore lacked the requisite education, training and experience in treating cancer patients to qualify as an expert. *See* Rubanick v. Witco Chem. Corp., 576 A.2d 4, 14 (N.J. Super. Ct. App. Div. 1990), *modified*, 593 A.2d 733 (N.J. 1991).

56. *Rubanick*, 593 A.2d at 737.

57. *Id.* at 735, 738.

58. *Id.* at 735.

59. *Id.* at 747-48.

60. *Id.* at 747.

61. *Rubanick*, 593 A.2d at 747. The court also stated that evidence found acceptable by other courts is persuasive. *Id.*

62. *Id.* at 746. The court specifically noted its approval of the Third Circuit's approach to admitting expert opinions. *Id.* The New Jersey test differs from the Third Circuit's test for admissibility in only one respect. The Third Circuit requires the fact finder to make two separate determinations of reliability — one for the data relied on by the expert, and one for the methodology the expert used to interpret the data. *Id.* The *Rubanick* court stated that the Third Circuit approach is dictated in part by "the seemingly separate requirements" of Rules 702 and 703 of the Federal Rules of Evidence. *Id.* For a discussion of the Federal Rules of Evidence, and a comparable New Jersey rule, see *supra* notes 38-40 and accompanying text. However, under New Jersey law, such a dichotomy was held unnecessary. *Rubanick*, 593 A.2d at 747.

63. *Id.* at 747-48.

Court has adopted a broad standard for the admission of expert testimony in toxic tort cases.[64] It remains to be seen whether other state courts will follow suit.

Thus, although the threshold for qualification of experts is not particularly high, a central focus of the expert deposition should be to establish where the witness's true area of expertise lies and where the expert is "out on a limb." It is also important to establish where the expert's methods and opinions lie in relation to those of the larger scientific community of which the expert is (purportedly) a member.[65] Finally, the basis for the opinions offered by the expert must be explored to determine the extent to which they are of the type commonly relied upon by respected experts, and the reasonableness of the assumptions made by the expert.

E. Speculative Expert Testimony — Groundwater Modeling Cases

Many private-plaintiff toxic tort cases share the common issue of whether contamination at a particular site actually travelled through the subsurface environment to the place where the plaintiffs were exposed to the harmful substances. Parties to litigation trying to prove or disprove a plaintiff's exposure to the relevant chemicals frequently resort to using mathematical computer models.[66] Such models are designed to permit the user to determine whether chemical concentrations found at a given location can be traced backward to the particular place and time that the chemical was released to the soil or groundwater. When such models are used, inevitable questions arise as to whether the expert who relies upon them is operating in the realm of fact or speculation; speculation would render the testimony incompetent.[67]

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64. *Id.* at 750.

65. To win a case, an attorney representing plaintiffs may need to employ "creative and far-reaching" strategies to get testimony admitted. Commentator suggestions include the following: (1) explaining "why the questions presented in a case are not answered in peer-reviewed medical or scientific journals," (2) showing that the plaintiff has not offered certain kinds of studies because only the defendant has the resources and information to perform such studies, and (3) demonstrating the financial connections and biases of a study's authors. Simon, *supra* note 30, at 38.

66. For a discussion of the use of computer models in toxic tort litigation, see *infra* notes 68-93 and accompanying text.

67. *See, e.g.*, Volasco Prod. Co. v. Lloyd A. Fry Roofing Co., 308 F.2d 383, 392 (6th Cir. 1962), *cert. denied*, 372 U.S. 907 (1963) ("The evidence must furnish some approximation of the actual damages so that they may be determined with reasonable certainty. We believe that here the plaintiff, in an effort to be

Although an extended discussion of computer modeling is well beyond the scope of this Note,[68] a few cases illustrate the issues surrounding computer models and the requirement that expert testimony avoid speculation. These issues will, most certainly, become the subject of an expert deposition in any toxic tort case. In *Sterling v. Velsicol Chemical Corp.*,[69] the plaintiffs were trying to prove that their immune systems were injured after they drank contaminated well water.[70] Plaintiffs employed a groundwater model to show that carbon tetrachloride and chloroform were in the wells at the time they drank from them.[71] The model made certain assumptions about such factors as loading rate,[72] infiltration rate,[73] dispersal rate,[74] transmissivity,[75] and groundwater velocity over more than a twenty year period.[76]

Although plaintiffs' model employed widely accepted modelling equations that were not in dispute, defendants challenged the model on grounds that the results it generated were nothing more than speculation.[77] Specifically, defendants complained that the model was fatally flawed because it was based on an insufficient number of data points (it only used one year's actual

specific, has indulged in theories that result in proof that is speculative, remote and uncertain." Therefore, court found that evidence should not have been admitted to trial.).

68. For an extended discussion of groundwater modeling, see Allen Kezsbom & Alan V. Goldman, *The Boundaries of Groundwater Modeling Under the Law: Standards for Excluding Expert Testimony*, 27 TORT & INS. L.J. 109, 109 (1991) [hereinafter Kezsbom].

69. 855 F.2d 1188 (6th Cir. 1988).

70. Kezsbom, *supra* note 68, at 116. For a further discussion of *Sterling*, see *supra* notes 32, 34-37 and accompanying text.

71. Kezsbom, *supra* note 68, at 116-17.

72. Loading rate is the rate of application of a material to the land surface. PRACTICAL HANDBOOK OF GROUND-WATER MONITORING 667 (David M. Nielson ed., 1991) [hereinafter Nielson]. In the *Sterling* case, the loading rate at issue was the amount of spent heptachlor catalyst placed into a landfill each year. Kezsbom, *supra* note 68, at 118 n.42.

73. Infiltration rate is the rate at which water flows downward from the land surface into and through the interstices (pores) in soil and rock. Nielson, *supra* note 72, at 664.

74. Dispersal (or dispersion) rate is the rate at which a liquid substance introduced in a ground-water system spreads as it moves through the system. *Id.* at 651.

75. Transmissivity is the rate at which water of a given density and viscosity is transmitted through a unit width of an aquifer or confining bed under a unit hydraulic gradient. *Id.* at 689. It is a function of the properties of the liquid, the porous medium, and the thickness of that medium. *Id.*

76. Kezsbom, *supra* note 68, at 117.

77. *Sterling*, 855 F.2d at 1198-99. Counsel for defendant Velsicol co-authored a paper discussing, *inter alia*, their challenge to the model employed by plaintiffs in *Sterling*. *See* Kezsbom, *supra* note 68, at 116-19.

groundwater contamination data) and because the model's estimates were not validated against available real-world data.[78] In particular, plaintiffs' model extrapolated backward in time from data obtained in 1978 only, even though post-1978 data also existed.[79] Thus, defendants argued, plaintiff could connect the 1978 point to virtually any point ten years earlier by simply adjusting the model's assumptions until the lines matched up, without being constrained by the later data points, which would have restricted the curve to a particular path.[80] However, the district court rejected these contentions, finding instead that the assumptions in plaintiffs' model about site conditions were more credible than those employed in defendant's model.[81] The Sixth Circuit upheld this finding on appeal.[82]

Two other examples are instructive. First, in *Carroll v. Litton Systems, Inc.*,[83] plaintiffs' expert testified in support of plaintiffs' questionable theory that groundwater flowed uphill from the source of the contamination to reach plaintiffs' wells.[84] While the expert proffered a theory by which this could happen, he failed to conduct any tests of plaintiffs' wells, never took any groundwater measurements in the area, and failed to review rainfall data that might support his theory.[85] Thus, the magistrate concluded that the expert's opinions were "completely lacking of an adequate factual basis as to when in the past chemicals allegedly arrived from the plant at plaintiffs' wells"[86] and that his testimony was "speculative and not based upon the kind of facts or data that would be relied upon by experts in the field."[87]

Second, in *Renaud v. Martin Marietta Corp.*,[88] another groundwater model was rejected on grounds that it was speculative.[89] The model was struck down because it was based upon data that was not representative of the contaminant load factor.[90] Plain-

78. Kezsbom, *supra* note 68, at 117-18. A data point is a place or time at which data (e.g., groundwater samples) are obtained.

79. Kezsbom, *supra* note 68, at 117.

80. *Id.* at 118.

81. *Id.* at 118-19.

82. *Id.* at 119.

83. No. B-C-88-253, 1990 WL 312969 (W.D.N.C. Oct. 29, 1990).

84. *See id.* at *77.

85. *Id.*

86. *Id.*

87. *Id.* at *78.

88. 749 F. Supp. 1545 (D. Colo. 1990), *aff'd*, 972 F.2d 304 (10th Cir. 1992).

89. Kezsbom, *supra* note 68, at 120.

90. *Id.* at 121. The court found this error to be "a fatal threshold flaw de-

tiffs' experts opined that 100 parts per million of the contaminant was discharged into a creek on a regular basis over an eleven year period, and from there travelled downstream to where plaintiffs lived.[91] However, the court deemed the experts' model unacceptable because it relied upon only one chemical sample, measured at only one place and time.[92] The model assumed (unjustifiably, according to the court) that contaminant loading persisted for the entire eleven year period at the very same concentration.[93]

In short, when deposing environmental experts, questions about the *basis* for the ultimate opinions must be probing and detailed. If real-world data exists that favors one's client, but which was ignored by the opponent's expert, this fact should probably be confirmed in the deposition.

F. Risk Assessment Experts

In some cases, the issue of risk assessment may arise. Simply stated, a risk assessment is an evaluation of whether contaminants located in a given source area can or did travel via various pathways, for example groundwater, foot traffic, or air, to certain receptors, such as humans or sensitive environments, and the risk posed by such exposure.[94] An expert in this area must be prepared to evaluate the nature and extent of the contamination in the source area, the migration pathways by which that contamination could move, the receptors in the area which might be affected, and the effect of measured or calculated exposures on such receptors.

Performed properly, a risk assessment is often a mammoth and expensive undertaking involving the concerted efforts of various disciplines.[95] Care should be taken to explore the expert's experience with risk assessments generally, his familiarity with the

priving the model of any predictive value." *Id.* "Load factor," as used by the experts in this case, referred to the quantification (in parts per million) of the amount of hydrazine contaminant that entered a creek from a wastewater treatment pond. *Renaud*, 749 F. Supp. at 1549.

91. *Renaud*, 749 F. Supp. at 1552.

92. Kezsbom, *supra* note 68, at 121 & n.55.

93. *Renaud*, 749 F. Supp. at 1552-53. *See also* Anderson v. Cryovac, Inc., 862 F.2d 910, 920 (1st Cir. 1988) (stating that plaintiff's model "was a matter of 'garbage in, garbage out' " because it was unable to reliably measure direction of groundwater flow).

94. *See* Natural Resources Defense Council, Inc. v. EPA, 824 F.2d 1258, 1266 (1st Cir. 1987).

95. *See* Redland Soccer Club, Inc. v. Department of the Army, No. 1:CV-90-1073, 1992 U.S. Dist. LEXIS 14420, at *16 (M.D. Pa. 1992) (discussing plaintiffs' incurring great expense to perform health risk assessment).

particular topography, soils, and hydrogeology at issue, and his understanding of the fate and transport of chemicals in the environment. It may be possible to discredit the expert's testimony by showing an unfamiliarity with the particular chemicals or environments at issue, or by getting the expert to concede that the site characteristics are extraordinarily complex and could just as easily support conclusions other than those reached by the expert.[96]

G. National Contingency Plan Compliance

In many cases, experts are employed to vouch for the adequacy of the investigatory and cleanup activities of the party seeking to recoup cleanup costs from other parties. In private-party cleanup actions brought under the federal Superfund law,[97] the activities for which reimbursement is sought must be consistent with a federal regulation known as the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP).[98] Although the details of the NCP are beyond the scope of this Note, the NCP can be summarized as a federal regulation which provides guidelines for the proper investigation and cleanup of contaminated properties.[99] Compliance with the NCP is required in order for private parties to recover their response costs from responsible parties.[100]

Issues which arise in NCP compliance cases include: (1) *which* version of the NCP applies (1985 or 1990),[101] (2) whether compliance must be "strict" or "substantial,"[102] (3) whether the investi-

96. *See* Simon, *supra* note 30, at 38.

97. "Superfund," as it is commonly known, is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). 42 U.S.C. §§ 9601-9675 (1988). Private party cost recovery actions are covered by § 107(a)(4)(B) of CERCLA. 42 U.S.C. § 9607(a)(4)(B).

98. CERCLA § 105, 42 U.S.C. § 9605. For more information on the NCP, see 40 C.F.R. §§ 300.1 to 300.1105 (1992).

99. 40 C.F.R. §§ 300.1 to 300.1105.

100. Superfund provides that, in private actions to recover the cost of responding to a release or threat of release of hazardous substances from a site, the response costs (e.g., investigation, removal, remediation) must be consistent with the NCP. CERCLA § 107(a)(4)(B), 42 U.S.C. § 9607(a)(4)(B).

101. The 1985 version of the NCP was published at 50 Federal Register 47,950 and was codified at 40 C.F.R. pt. 300. 40 C.F.R. pt. 300 (1985). The 1990 version was published at 55 Federal Register 8666 and is codified at 40 C.F.R. pt. 300. 40 C.F.R. pt. 300 (1990).

102. Pre-1985 regulations generally required strict compliance, especially for private party cost recovery actions. In contrast, the 1990 regulations require substantial compliance. *See* County Line Inv. Co. v. Tinney, 933 F.2d 1508, 1514 (10th Cir. 1991).

gation/cleanup must meet the NCP's requirements for a "removal" action or a "remedial" action,[103] and what "ARARs" (applicable or relevant and appropriate cleanup criteria) apply to the cleanup.[104] These requirements are the subject of EPA guidance documents and a developing body of federal case law, and can be counted on to become the centerpiece of much fighting at expert depositions.

V. SUMMARY

An expert deposition is a double-edged sword. If the witness is testifying for your client, the object is not to win the case or impress the attending lawyers with the witness's knowledge and credentials. In fact, the less an opponent can find out about one's expert the better off you will be at trial. In some cases, it is advantageous to have an expert put on a lackluster (albeit technically sound) performance at the deposition so that an opponent will report to his client that the expert is nothing to worry about at trial. At the time of trial, a litigator can stun the opponent with the skillful examination of a now charming, engaging, and impressive expert.

If one is taking the deposition, the object is quite different. At the very least, the witness's training, education, experience, biases, and weaknesses should be fully explored. An attempt should be made to box-in the expert to avoid being surprised at trial with new data or new opinions which were not inquired about at the deposition. While an attorney may want to impeach the expert's testimony with prior, contradictory testimony, such questioning can also be deferred in hopes of catching the opponent off-guard at trial. Perhaps most importantly, the witness's knowledge of the underlying facts should be exhausted, and no opinions should be left unexplored. Also, the use of hypotheticals, using facts one hopes to prove at trial, can be very useful; if one succeeds in getting an opponent's expert to render an opinion supportive of your client's position using facts ultimately found in your client's favor, the results can obviously be quite stunning.

While expert depositions are quite similar in appearance, and though most of the usual deposition rules apply, such proceed-

103. A removal action is essentially an emergency response. CERCLA § 101(23), 42 U.S.C. § 9601(23). A remedial action refers to a permanent remedy to cleanup a site. CERCLA § 101(24), 42 U.S.C. § 9601(24).

104. CERCLA § 121(d), 42 U.S.C. § 9621(d).

ings can be intimidating for attorneys, particularly if they lack technical training or experience. However, since the expert's testimony will ultimately have to be tried to a judge or jury (neither of whom is likely to be familiar with the underlying facts or technically sophisticated), it is perfectly acceptable to ask simplistic, lay questions. In some cases, the expert will let down his guard when he learns that the interrogator is technically unsophisticated and will give damaging testimony in response to broadly-worded questions.

Many experienced litigators subscribe to the anecdotal view that cases are won, not at trial, but at depositions, particularly those of expert witnesses. Careful and thorough preparation for expert depositions always pays off at trial. The foregoing brief discussion of some of the critical issues surrounding such depositions should go a long way toward assisting attorneys who must defend or take such depositions.